

B Sc DEGREE END SEMESTER EXAMINATION - OCT. 2020 : FEBRUARY 2021**SEMESTER 1 : PHYSICS (CORE COURSE)****COURSE : 19U1CRPHY1 : METHODOLOGY AND PERSPECTIVES OF PHYSICS***(Common for Regular - 2020 Admission & Improvement / Supplementary - 2019 Admission)*

Time : Three Hours

Max. Marks: 60

PART A**Answer any 8 (2 marks each)**

1. Mention the contributions of Rayleigh.
2. What are the predictions of general theory of relativity?
3. Who proved Quantum nature of radiation? Briefly explain it
4. What is the least count of a meter scale and vernier calipers?
5. Explain the uncertainty in the product of two measured quantities.
6. Explain the concept of positional weights.
7. Discuss the various ways in which del operator can act.
8. Give the transformation matrix of a 2D vector rotation.
9. Give the circuit of a half adder.
10. Make a note on integrals associated with a vector.

(2 x 8 = 16)**PART B****Answer any 6 (4 marks each)**

11. Give an expression for the relative error in Z if $Z = (A B^{1/2}) / (C^{3/2} D)$
12. A rectangular board is measured with a scale with accuracy 0.2 cm. the length and breadth are measured as 35.4 cm and 18.4 cm respectively. Find the relative error and percentage error of the area calculated
13. The length, breadth and thickness of a rectangular sheet are 3.234 m, 2.005 m and 2.01 m respectively. Determine the area and volume to the correct significant figures.
14. The weight of substance measured to have values 1.29 g, 1.33 g, 1.34 g, 1.35 g, 1.32 g, 1.36 g, 1.30 g and 1.33 g. Calculate the mean, absolute error, relative and percentage error.
15. Find the transformation matrix R that describes a rotation by 120 degrees about an axis through the origin and (1,1,1). Rotation is anticlockwise as you look towards origin through the axis from the given point.
16. Find the components of the area vector passing through (1,0,0) , (0,2,0) and (0,0,3).
17. In two dimensions, check the transformation of divergence.
18. Find the decimal equivalents: (i) $FE86.3934_{16}$ and (ii) $AE95.2234_{16}$

(4 x 6 = 24)**PART C****Answer any 2 (10 marks each)**

19. Explain a) photoelectric effect and its significance b) Raman effect and its significance
20. Describe with theory the instruments for measuring current. How will you convert a galvanometer of resistance 12 ohms showing full scale deflection for a current of 3 milli ampere to an Ammeter of range 0 to 6 Ampere?
21. State and prove the fundamental theorems on gradient and divergence.
22. Find (a) $1024 + 5096$, (b) $1024 - 5096$, (c) $-1024 + 5096$ and (d) $-1024 - 5096$ using 2's complement. The numbers given are in decimal system.

(10 x 2 = 20)